

Picture of the Week: Biocrusts: small organisms, big impacts

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Arid lands constitute over 30% of the Earth's terrestrial surface. In arid lands worldwide, composite layers called biocrusts, comprising bacteria, fungi, lichens and mosses, cover the soil between the widely spaced plants. These organisms play vital roles in arid ecosystems: they stabilize the soil from wind and water erosion, benefit plant growth, and, like plants, biocrusts fix atmospheric carbon (CO₂) and nitrogen into nutrients in the soil. In collaboration with the US Geological Survey (USGS), Los Alamos National Laboratory scientists are studying how arid land biocrusts adjust to changes in climate (atmospheric CO₂, nitrogen deposition, warming temperatures, altered precipitation patterns) and changes in land use. The image above shows a close-up of a biological soil crust (biocrust) showing dark-pigmented microorganisms that use the coloring to protect against strong sunlight.

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Through [research conducted by Los Alamos in collaboration with the USGS](#), scientists have discovered that biocrusts are physically and physiologically sensitive, and that combinations of altered environmental conditions (atmosphere, temperature, precipitation frequency) and increased intensity of land use have negative impacts on their ecosystem functions. Why does this matter? Scientists note that loss of the biocrusts results in increased soil erosion, reduced plant establishment, and loss of a widespread soil component that may sequester additional carbon and nitrogen we are introducing to the atmosphere.

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